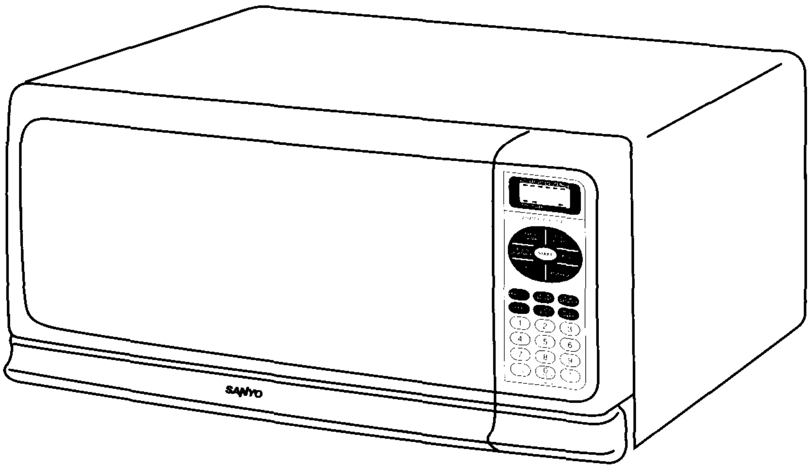
SANYO

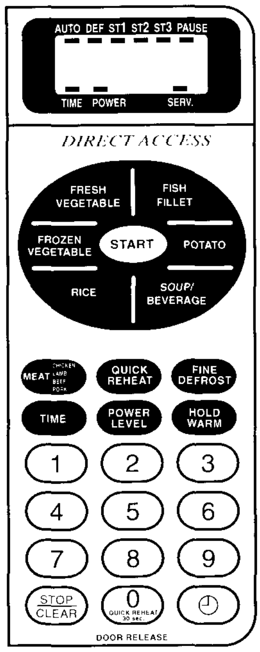
FILE NO.

SUPPLEMENT OF SERVICE MANUAL

Microwave Oven

EM-X400S (New Zealand)





Product Code No.	437 376 51

See the service manual of EM-N102WS(SM-860078) except the items described in this service manual.

Foreword

Read this manual carefully, especially precaution on microwave energy, and follow the procedure strictly. Careless servicing and testing may expose yourself to the microwave energy leakage.

PRECAUTIONS

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(a) Do not operate or allow the oven to be operated with the door open.

(b) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:

(1) Interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.

(c) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.

(d) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

REFERENCE NO. SS-860127

— TABLE OF CONTENTS —

1. SPECIFICATIONS

Rated Power Consumption 1260W
Microwave Output 850W
Frequency .... 2,450MHz±50MHz
Power Supply .... 230~240V, 50Hz
Rated Current .... 5.5Amp.
Safety Devices .... Thermal Protector, Open at 122°C for Cavity.
Thermal Protector, Open at 122°C for Magnetron.
Fuse (Cartridge Type 8A)
Primary Interlock Switch
Door Sensing Switch and Relay 2
Interlock Monitor Switch
Timer .... Electronic Digital, up to 99 min. 99 sec.
Overall Dimensions .... 525(W) x 418(D) x 283(H) mm
Oven Cavity Size .... 350(W) x 371(D) x 208(H) mm
Turn Table Diameter 340mm
Effective Capacity of Oven Cavity .... 26 liters
Net Weight .... Approx. 18 Kg

2. POWER OUTPUT MEASUREMENT

NOTE

The power output specification, 850W on this model is measured with IEC measurement. The power output is measured with two (2) liters water is equivalent to 850W in measurement with IEC, when measured with the following power output.

(A) 1. Fill two test bowls with each 1 liter water respectively.
2. Use accurate thermometer and measure each water temperature respectively.

(B) Place the two bowls on glass turntable.

(C) 1. Set cooking time to two (2) minutes. ("2 00" appears in display)
2. Touch START key and operate oven for exactly two (2) minutes.

(D) 1. Take out the two bowls at once.
2. Stir both water with thermometer and measure the water temperature rise respectively.

(E) 1. Get temperature rise by calculating the difference (water temperature after cooking minus initial temperature) in each bowl.
2. Then calculate average value(t) of both temperature rises in degrees centigrade.
3. Then work out;
Power Output (watt) = 70 x Δt

(F) Power output shall be in the following range

Average temperature rise	Microwave Power output
Minimum 9.9°C	693W
Maximum 12.6°C	882W

(G) Power Output will be influenced by line voltage of power supply. Consequently, correct power output must be measured within 240V AC ± 2 volts while unit is operating.

3. CIRCUIT DIAGRAM

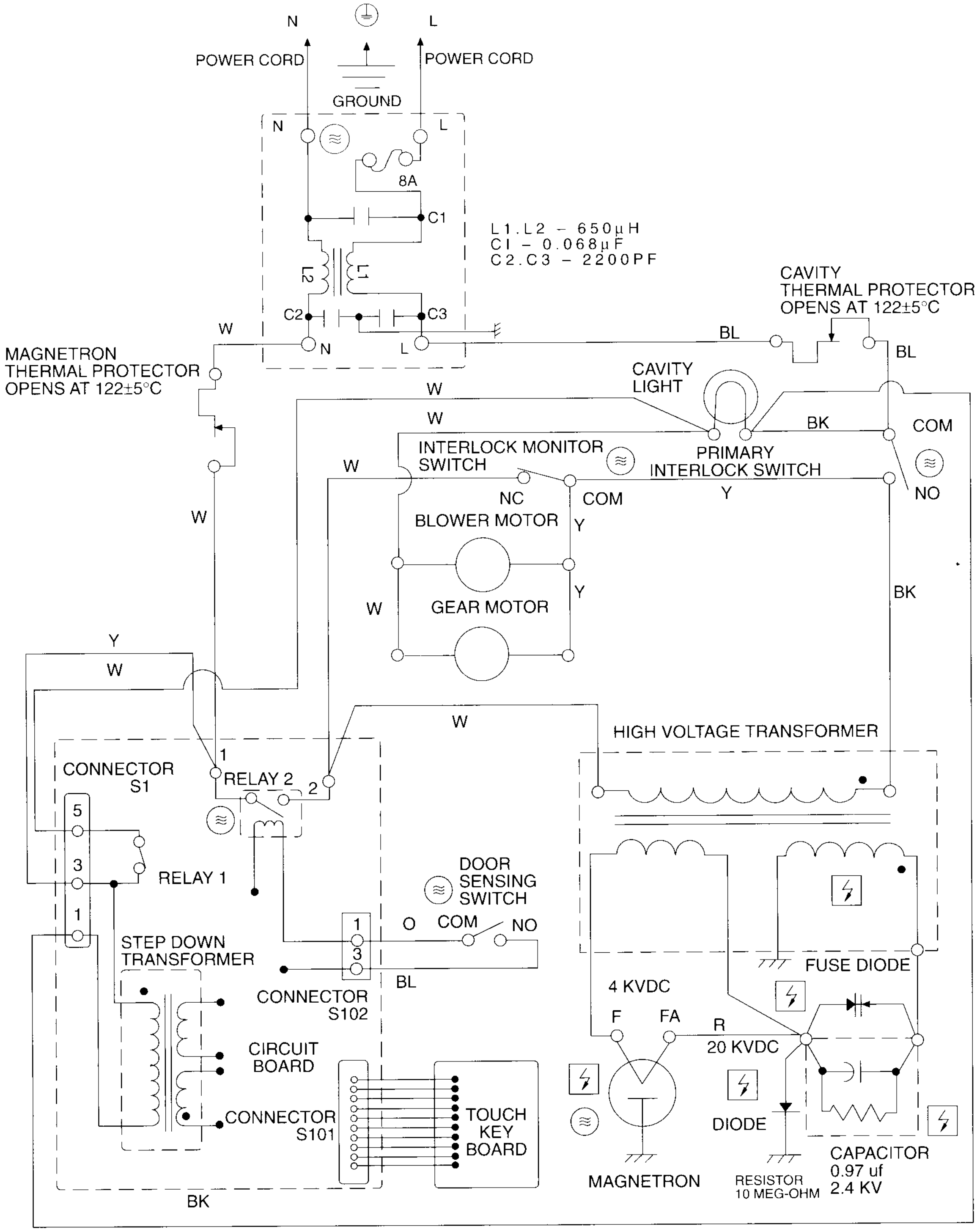


Figure 1

SWITCH MADE •	PRIMARY INTERLOCK SWITCH	INTERLOCK MONITOR SWITCH	SECONDARY INTERLOCK: DOOR SENSING SWITCH	SECONDARY INTERLOCK: RELAY 2
CONDITION	COM / NO	COM / NC	COM / NO	COM / NO
DOOR OPEN		•		
DOOR CLOSE	•		•	•

WIRING COLOUR

BK : BLACK
O : ORANGE
BL : BLUE
W : WHITE
Y : YELLOW
R : RED

Parts marked with this sign are supplied with high voltage exceeding 250V.

Parts marked with this sign have special characteristics important for microwave leakage. When replacing any of these parts use only manufacturers specified parts.

4. TEST PROCEDURES

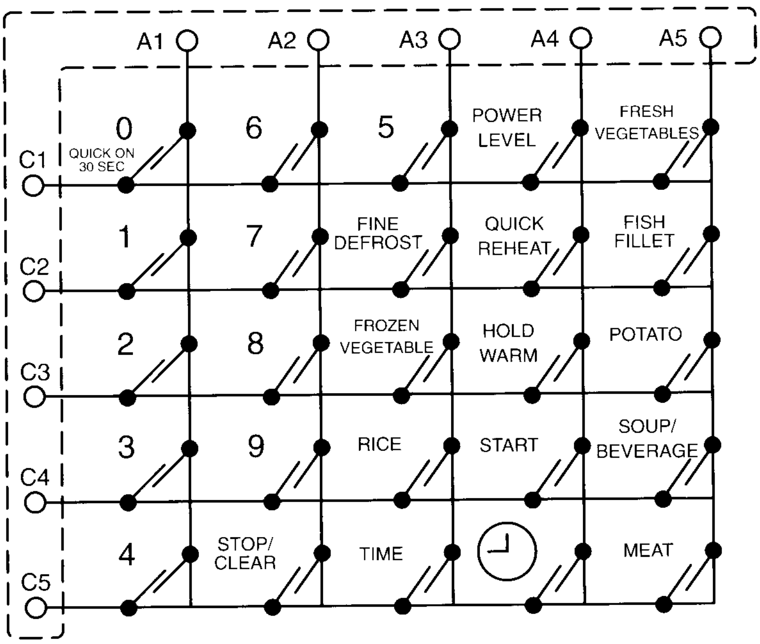
COMPONENT	CHECKOUT PROCEDURE	RESULT
TOUCH KEY BOARD	Measure the resistance between terminals of FPC connector after removing it from S101. (Figure 2). **NOTE** - When reconnecting the FPC connector, make sure the holes on the connector are properly inserted in hooks of the plastic fastener in S101.	See below

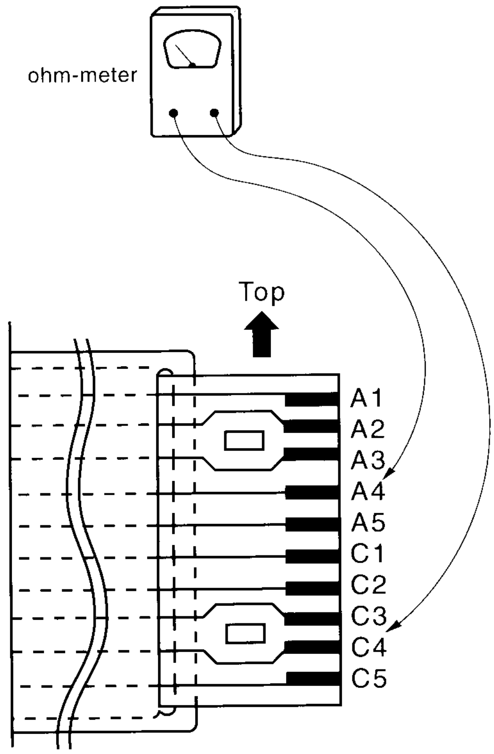
Resistance value	When touched	When not touched
	Less than 1K Ohms	More than 1 MEG Ohm

When checking "START" key, connect ohm-meter as illustration below.

MATRIX CIRCUIT FOR TOUCH KEY BOARD

FPC CONNECTOR





TERMINALS OF FPC CONNECTOR

Figure 2

COMPONENT	CHECKOUT PROCEDURE	RESULT
CONTROL CIRCUIT BOARD	Measure the voltage: Between test points TP-1, TP-2 or TP-3 and ground or between TP-4, and TP-5. (See control circuit board on page 9). NOTE – Proceed with the check of the step-down transformer, to see if any one of the measured values is different from the specified values.	See below

Test point	TP-1	TP-2	TP-3	TP-4/ TP-5
Voltage	–20V DC	+5V DC	+15V DC	2.0V AC

5. DISASSEMBLY INSTRUCTIONS

A. REMOVING BLOWER MOTOR

(Figures 3 (Top View) and 4)

(1) Remove screw securing the stay.

(2) Disconnect all lead wires from the blower motor and H.V. capacitor.

(3) Remove 2 screws securing the blower base and disengage 3 hooks from the rear plate of cavity (Figure 4)

(4) Remove 1 screw securing the blower motor with the blower base.

B. REMOVING MAGNETRON

(Figure 3 (Top View))

After removing the blower motor:

(1) Remove duct (mag. intake) and duct (mag. exhaust).

(2) Remove 1 screw securing the thermal protector.

(3) Disconnect 2 lead wires from the magnetron.

(4) Remove 4 screws securing the magnetron to the waveguide.

(5) Take out magnetron VERY CAREFULLY.

NOTES

1. When removing the magnetron from the cavity or wave guide, use a proper care so that the dome of the magnetron does not hit any adjacent parts of microwave oven.
2. Make sure that the contact face of the magnetron gasket is free from any damage or deformation.
3. Adjust the position of the magnetron properly, so that it correctly sits in place and the magnetron gasket is in contact with the mounting rim evenly.
4. While holding the magnetron under this condition, tighten mounting screws or nuts with your fingers temporarily.
5. Further tighten the screws or nuts with a box wrench, giving one or two turns to each of the screws (or nuts) alternatively so that the magnetron is mounted on to the bracket uniformly.
6. After replacing the magnetron, be sure to check the microwave energy leakage with a leakage detector and confirm the leakage is below 5 mW/cm^2.

NOTES

When inserting duct (mag. exhaust), overlap the lower tab of the duct onto the magnetron, at the same time ensure the hook on the duct is properly engage to the magnetron (See figure 5).

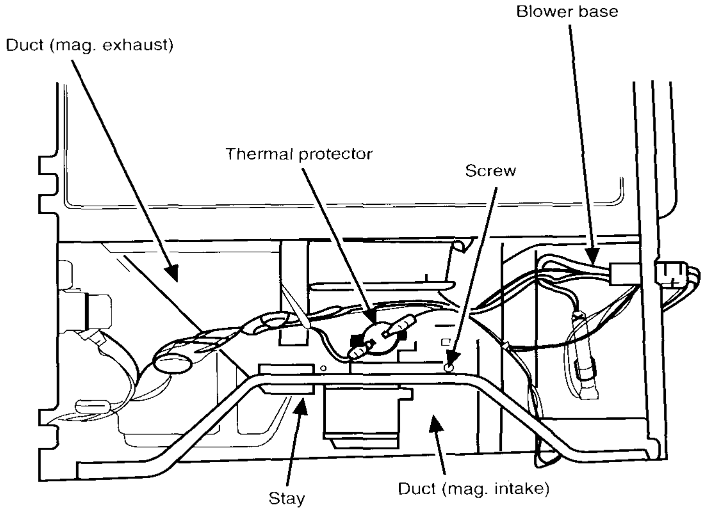


Figure 3 (Top View)

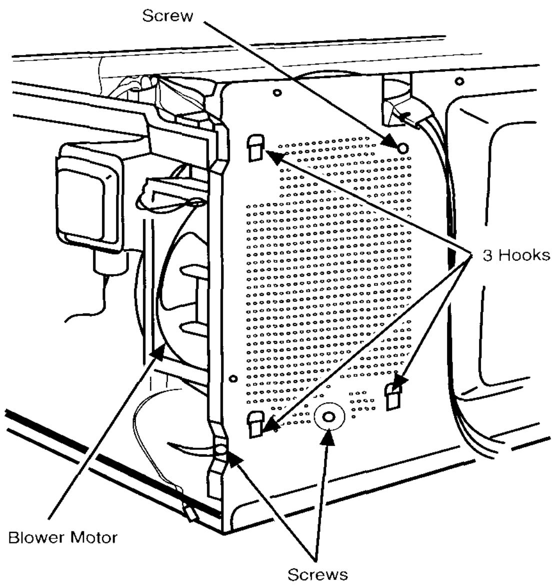


Figure 4

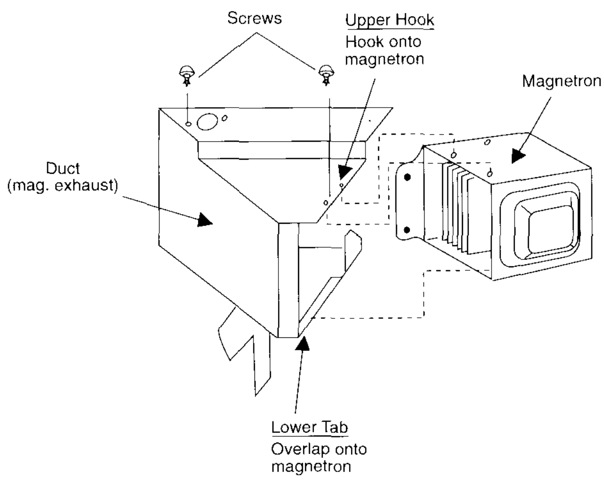
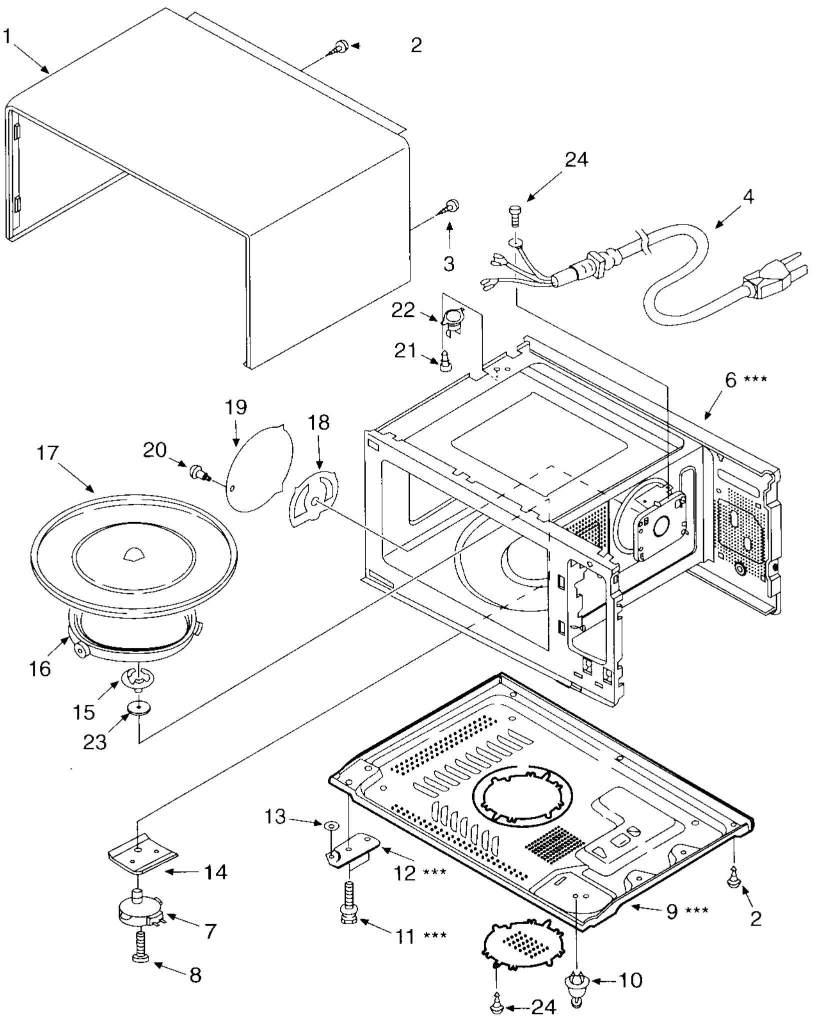


Figure 5

6. EXPLODED VIEW AND PART LIST
CAVITY PARTS

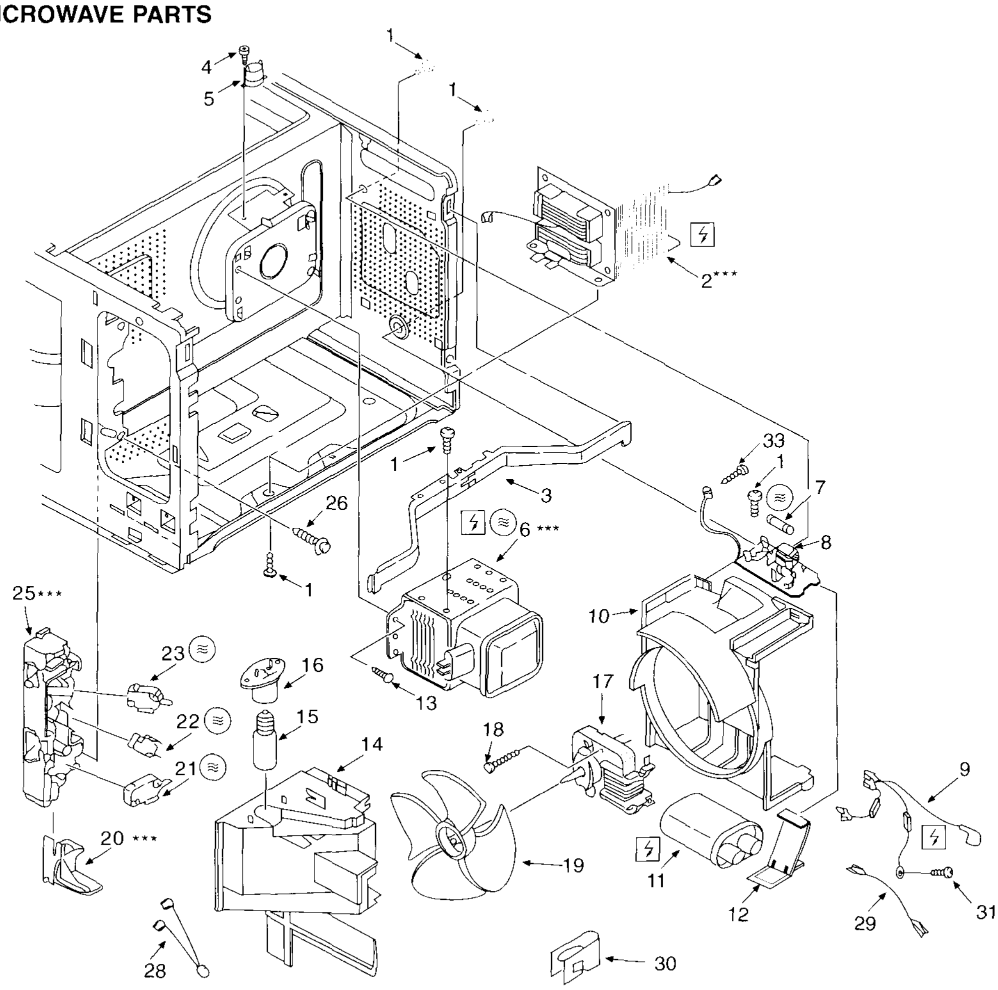


*** ALL SERVICE ON MICROWAVE OVENS SHOULD BE PERFORMED BY A QUALIFIED TECHNICIAN USING APPROVED TESTING EQUIPMENT. CUSTOMERS SHOULD NOT ATTEMPT TO REPLACE PARTS IDENTIFIED BY A TRIPLE ASTERISK (***)

Key No.	Part No.	Description	Q'ty
1	617 186 2072	Cabinet (Also order circuit diagram when replacing Cabinet)	1
2	411 082 5201	SCR TPG TRS 4X10 Z1	8
3	411 160 6007	SCR TPG TRS + SRT 4X10mm	4
4	617 138 5113	Power Cord	1
5			
6	617 188 7914	Oven Cavity *** (Not Service Parts)	1
7	617 151 2458	Gear Motor	1
8	411 010 5808	SCR EVR PAN 4X10 Z1	2
9	617 138 5601	Bottom Plate *** (Not Service Parts)	1
10	617 144 5435	Plastic Foot with Canoe Clip	4
11	411 011 0802	Bolt Hex + SW + W 5X14mm Z1 ***	2

Key No.	Part No.	Description	Q'ty
12	617 124 0795	Hinge, Lower ***	1
13	411 089 2500	Washer F 5x10x0.8	1
14	617 120 8481	Insulation Sheet	1
15	617 144 4476	Turn Table Shaft	1
16	617 181 2657	Roller	1
17	617 124 2393	Rotating Tray	1
18	617 181 4248	Antenna	1
19	617 162 1938	Cavity Cover	1
20	411 069 1707	SCR TPG TRS 4X6 DA	1
21	411 007 6900	SCR TPG PAN 3X6 Z1	1
22	617 124 1235	Thermostat, Cavity 122°C	1
23	617 080 5315	Special Washer	1
24	411 160 6106	SCR S-T PAN 4X10 Z1	2

SWITCHES AND MICROWAVE PARTS



Parts marked with this sign are supplied with high voltage exceeding 250V.

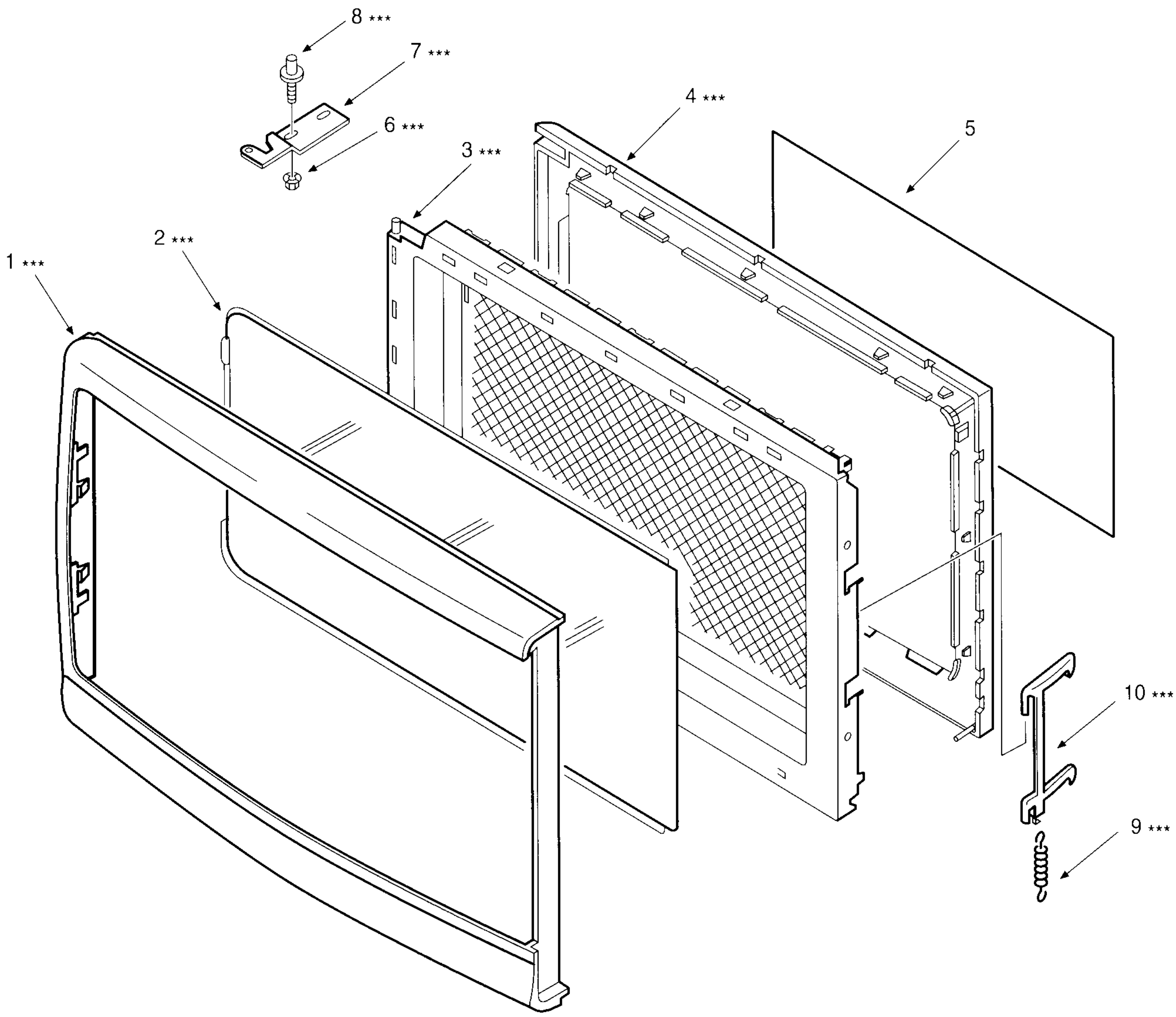
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Key No.	Part No.	Description	Q'ty
1	411 082 5201	SCR TPG TRS 4X10 Z1	8
2	617 174 2084	H.V.Transformer, N5T-S728SAP***	1
3	617 171 8706	Stay, Cavity & Magnetron	1
4	411 007 6900	SCR TPG PAN 3X6 Z1	1
5	617 124 1235	Thermostat, Magnetron, 122°C	1
6	415 002 6002	Magnetron, 2M218H(N) A ***	1
7	423 022 7503	Fuse, 250V 8A	1
8	617 185 0024	PCB Complete	1
9	617 180 5741	Lead Wire Ass'y (including Diode)	1
10	617 162 1990	Space Partition (Blower)	1
11	617 185 7139	High Voltage Capacitor including Resistor, 0.97µf 2.4 KV	1
12	617 182 2373	Capacitor Band	1
13	411 011 5609	Bolt Hex 4x10 Z1	4
14	617 181 2534	Duct, Mag. Exhaust	1
15	617 110 3618	Lamp, 240V 25W	1
16	617 124 1280	Lamp Socket	1
17	617 167 0592	Blower Motor	1

Key No.	Part No.	Description	Q'ty
18	411 082 5201	SCR TPG TRS 4X10 Z1	2
19	617 196 8507	Blower Fan	1
20	617 124 1181	Latch Lever***	1
21	617 167 0523	Micro Switch, Primary Interlock V-5P030FBX129***	1
22	617 004 5575	Micro Switch, Interlock Monitor V-5220DZ***	1
23	617 167 0523	Micro Switch, Door Sensing V-5P030FBX129***	1
24			
25	617 124 1174	Lever Stopper***	1
26	411 102 5907	SCR ETG TRS 4X10 N2	2
27			
28	617 117 3505	Harness, Door Sensing	1
29	617 124 3796	Lead Wire Ass'y	1
30	617 132 5713	Insulation Sheet	1
31	411 001 4704	SCR S-T PAN 4X10 Z1	1
32			
33	411 160 6106	SCR S-T PAN 4X10 Z1	1

DOOR PARTS

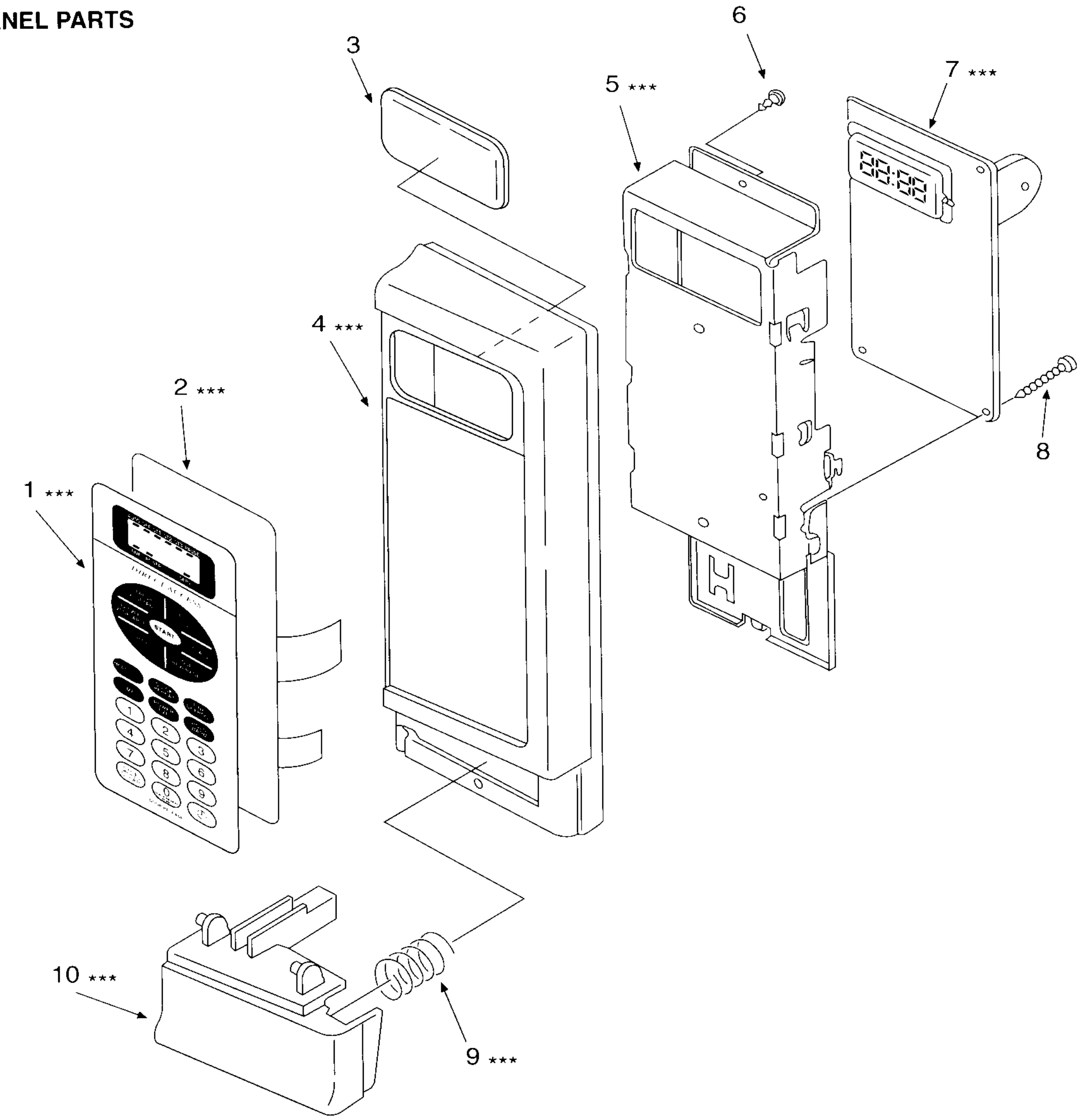


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Key No.	Part No.	Description	Q'ty
1	617 195 6511	Door Cover ***	1
2	617 195 6535	Door Panel ***	1
3	617 138 5625	Door Main Frame *** (Also order Door Sheet when replacing Door Main Frame)	1
4	617 152 0804	Choke Dielectric ***	1
5	617 195 0281	Door Sheet	1
6	411 054 1903	Nut Hex + Flg W/SRT 5 ***	2

Key No.	Part No.	Description	Q'ty
7	617 124 0955	Hinge, Upper ***	1
8	411 011 0802	Bolt Hex + SW + W 5X14 ***	2
9	617 101 1494	Spring ***	1
10	617 179 2478	Door Latch ***	1

CONTROL PANEL PARTS



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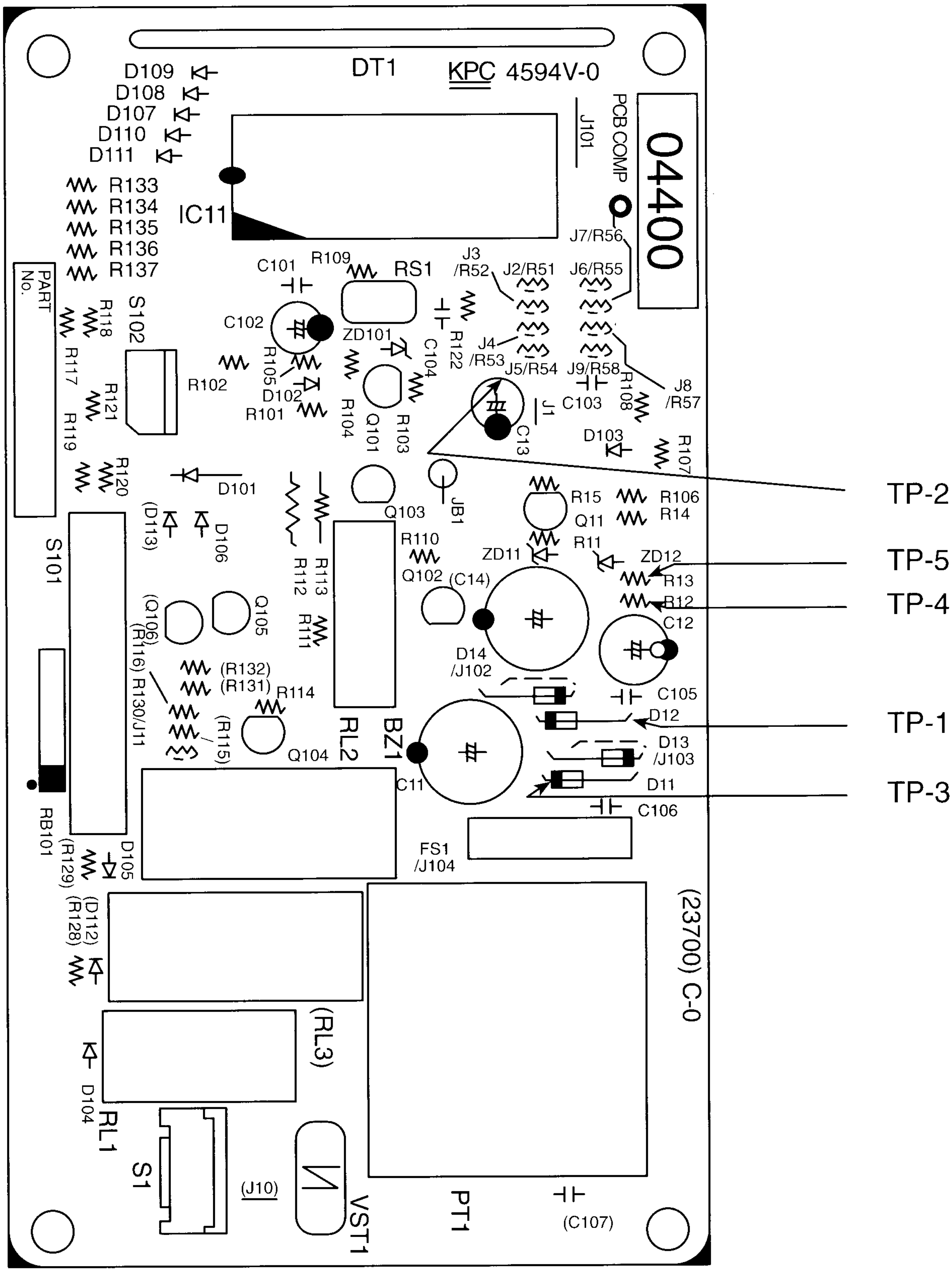
Key No.	Part No.	Description	Q'ty
1	617 193 7015	Control Sheet*** (Also order Touch Key Board when replacing Control Sheet)	1
2	617 151 4384	Touch Key Board *** (Also order Control Sheet when replacing Touch Key Board)	1
3	617 151 4346	Control Plate	1
4	617 151 4360	Control Frame ***	1
5	617 151 4377	Control Base ***	1
6	411 160 6205	SCR TPG TRS + SRT 4x10 Z1	1

Key No.	Part No.	Description	Q'ty
7	617 183 7674	Control Circuit Board Complete ***	1
8	411 129 5805	SCR TPG BIN 3x10 Z1	2
9	617 080 9559	Spring, Door Release Lever ***	1
10	617 151 4339	Door Release Lever ***	1

PRINTED MATTER (Items Not Illustrated)

Key No.	Part No.	Description	Q'ty
	617 198 7324	Cook Book	1
	617 193 7541	Operating Instructions	1
	617 193 7107	Carton Box	1
	617 200 0886	Name Plate	1
	617 189 1850	Circuit Diagram	1

CONTROL CIRCUIT BOARD
(Part No. 617 183 7674)

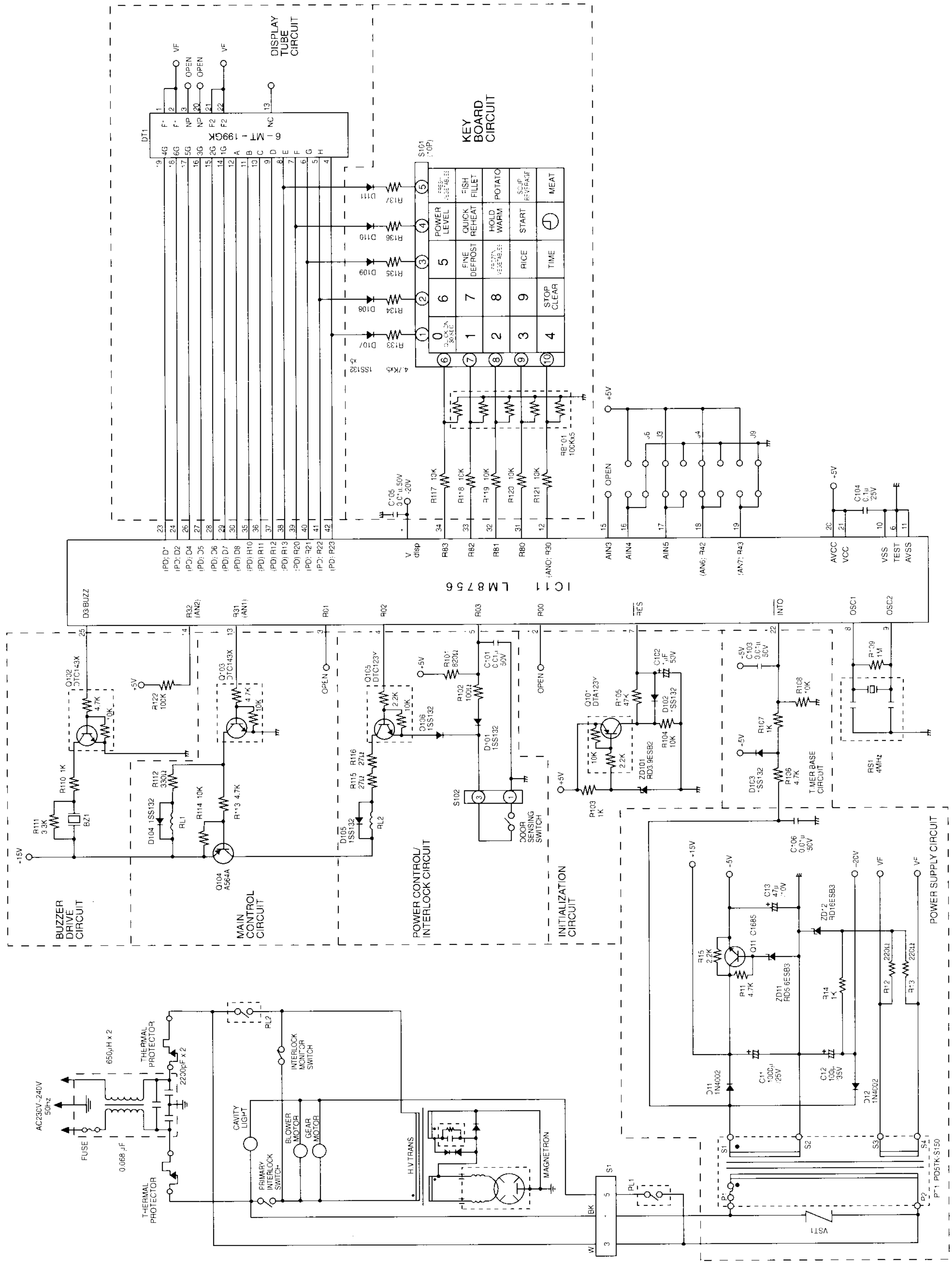


CONTROL CIRCUIT BOARD
(Part No. 617 183 7674)

Key No.	Order Part No	Description	Q'ty
INTEGRATED CIRCUIT			
IC11	409 378 9804	IC LM 8756-B60S	1
TRANSISTORS			
Q102, Q103	405 000 5612	DTC143XS-TP	2
Q105	405 080 0217	DTC123YS-TP	1
Q11	405 035 4819	2SC1685-Q-TP	1
Q104	405 004 3010	2SA564A-Q-TP	1
Q101	405 082 4619	DTA123YS-TP	1
DIODES			
ZD11	407 057 0510	RD5.6ESB3	1
ZD12	407 078 9031	RD16ESB3-TP	1
ZD101	407 132 2316	HZS3.9NB2	1
D11, D12	407 012 0220	IN4002-TP	2
D101-111	407 012 4317	ISS132-TP	11
CAPACITORS			
C11	403 152 7218	Electrolytic, 1000mfd, +-20%, 25V	1
C12	403 152 7327	Electrolytic, 100mfd, +-20%, 35V	1
C13	403 147 8629	Electrolytic, 47mfd, +-20%, 10V	1
C102	403 147 8837	Electrolytic, 1mfd, +-20%, 50V	1
C104	403 002 4728	Electrolytic, 0.1mfd, +-5%, 25V	1
C101, 103, 105-106	403 069 8355	Ceramic, 0.01mfd +-5%, 50V	4

Key No	Order Part No.	Description	Q'ty
RESISTORS			
R102	401 012 4434	Carbon, 100 ohms +- 5%, 1/4W	1
R14, 103, 107 110	401 012 5639	Carbon, 1K ohms +- 5%, 1/4W	4
R104, 108, 114 117-121	401 012 6953	Carbon, 10K ohms +-5%, 1/4W	8
R122	401 012 8056	Carbon, 100K ohms +-5%, 1/4W	1
R109	401 012 9231	Carbon, 1M ohms +-5%, 1/4W	1
R12, 13	401 016 2555	Carbon, 220 ohms +-5%, 1/4W	2
R15	401 016 3750	Carbon, 2.2K ohms +-5%, 1/4W	1
R115, 116	401 016 9653	Carbon, 27 ohms +-5%, 1/4W	2
R112	401 018 2751	Carbon, 330 ohms +-5%, 1/4W	1
R111	401 018 3738	Carbon, 3.3K ohms +-5%, 1/4W	1
R11, 106, 113 133-137	401 020 1957	Carbon, 4.7K ohms +-5%, 1/4W	8
R105	401 020 2835	Carbon, 47K ohms +-5%, 1/4W	1
R101	401 023 1637	Carbon, 820 ohms +-5%, 1/4W	1
RESISTORS BLOCKS			
RB101	617 010 3541	100K ohms, +-10%, 5-pc, 1/8W	1
MISCELLANEOUS			
BZ1	420 000 6800	Buzzer PKM22EPT-2001	1
DT1	617 185 3735	Display Tube	1
RL1	617 137 9358	Relay, OJE-SH-112LM	1
RL2	617 141 0549	Relay, DEC DU12D1-1PR	1
RS1	617 128 3372	Ceramic Resonator, CST4.00MGW	1
S1	617 169 4109	Connector	1
S101	617 124 5059	Connector, 10P Male	1
S102	617 111 1392	Connector, 2/3P, Male	1
VST1	407 118 5505	Varistor ENC471D-10A	1
PT1	617 171 2155	Step-down Transformer, PD5TK-S150	1
JB1	617 132 5744	Noise Filter	1
2	617 079 4107	Spacer, Display Tube	1
J1, 3, 4, 6, 9, 10	617 079 4299	Jumper	6
J101-104	617 079 4237	Jumper	4

7. OVERALL CIRCUIT DIAGRAM



SANYO

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Osaka, Japan

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